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International Agricultural Trade and Policy Center

**THE DERIVED DEMAND FOR IMPORTED CHEESE INTO
HONG KONG**

By

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PBTC 05-02

May 2005

POLICY BRIEF SERIES



**UNIVERSITY OF
FLORIDA**

Institute of Food and Agricultural Sciences

INTERNATIONAL AGRICULTURAL TRADE AND POLICY CENTER

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The Derived Demand for Imported Cheese into Hong Kong

Andrew A. Washington, Richard L. Kilmer and Jiaojun Ge¹

Abstract

The objective of this paper is to provide the U.S. dairy industry with empirical estimates of Hong Kong's derived demand for imported cheese from the U.S. These estimates were used to project the effects of the European Union (E.U.) subsidy reductions on the U.S. share of Hong Kong cheese imports. Hong Kong cheese imports from the U.S. were projected to increase by 16.96% if subsidy reductions continue at the same pace as the 1994 GATT agreement and 33.92% if reductions were twice the pace.

Introduction

Under the General Agreement on Tariffs and Trade (GATT), the European Union (E.U.) export subsidy may be reduced by as much as 36%. Since an export subsidy is a payment by a government to their exporters, this will allow the exporters to sell their commodity to another country at a reduced price. If a government reduces its subsidies to its exporters, the exporters must increase the price they charge importers for the exporter's commodity. Because the subsidizing country's exporters must charge a higher price in order to cover expenses, their exports are reduced. At the same time, exporters from other countries will experience an increase in their exports as they are more price competitive with the previously subsidized exporters. This

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change in E.U. policy will benefit the U.S. dairy industry because the U.S. cheese price will be more competitive with the increased E.U. price.

In today's international trade market, people have become more aware of the significance of export markets. The quantitative analysis of import demand information for different countries and for individual dairy products is extremely important to the U.S. dairy industry producers and processors. The information will help the industry build export markets and capture market share from the potential increase in import demand.

The objective of this paper is to provide the U.S. dairy industry with estimates of the derived demand for imported cheese into Hong Kong, the sensitivity of the quantity demanded for U.S. cheese exported to Hong Kong to price, and the effects of export subsidy reductions on the derived demand for U.S. cheese imported into Hong Kong.

Background of U.S. and Hong Kong cheese market

The U.S. Dairy Export Council (USDEC) has nine offices located in nine countries around the world, including one office in Hong Kong. Among all international markets investigated by USDEC, Hong Kong was identified as a potential growth area for U.S. cheese. This potential growth is based on: (1) milk product consumption per-capita in Hong Kong tended to be the highest in the Asian market (USDEC, 1996), (2) per-capital milk consumption had grown by nearly 10% annually since 1990 (FAO statistics, 1999), (3) Hong Kong had experienced economic growth for the last two decades (Central Intelligence Agency, 1999), and (4) Hong Kong is a major re-exporter to mainland China. Hong Kong is nearly 100% dependent on dairy imports to satisfy its dairy demand. Hong Kong cheese imports grew by 6.1% annually from 1993 through 2003 (Table 1). The percentage change for the

World during the same period was 4.8%.

Table 1. Hong Kong and World Cheese Imports, 1993-2003.

Year	Cheese Imported (Metric Tons)			
	Hong Kong	% Change	The Whole World	% Change
1993	5,306	~	2,124,028	~
1994	6,061	14.2%	2,356,235	10.9%
1995	5,946	-1.9%	2,344,965	-0.5%
1996	6,789	14.2%	2,497,340	6.5%
1997	7,718	13.7%	2,588,479	3.6%
1998	7,498	-2.9%	2,542,627	-1.8%
1999	7,860	4.8%	2,672,308	5.1%
2000	9,160	16.5%	2,822,849	5.6%
2001	9,452	3.2%	2,976,320	5.4%
2002	10,333	9.3%	3,103,112	4.3%
2003	9,247	-10.5%	3,376,223	8.8%
Average(1993-2003)	7,761	6.1%	2,673,135	4.8%

Source: FAOSTAT Database, 2005

For the period 1993 to 2003, U.S. cheese exports increased by an average of 12.0% per year (Table 2). This is higher than the yearly change in World cheese exports (4.6%) for the same period. However, the percentage change in U.S. cheese exports from 2000 to 2003 was 3.4%, which is lower than the 4.7% increase in World cheese exports during the same period.

Dairy Trade Subsidies

In 2001, the E.U. was both the largest producer (21.3%) and the largest consumer (21%) of cow's milk in the world, compared to 13.1% and 12% for the U.S. (CEC). The E.U. provides more than \$1 billion in dairy export subsidies which is more than 100 times what the U.S. is allowed to spend (NMPF). From 2000 through 2002, U.S. dairy exports that were unsubsidized represented 81, 86, and 84 percent of

total U.S. dairy exports.

Table 2. U.S. and World Cheese Exports, 1993-2003.

Year	Cheese Exported (Metric Tons)			
	U.S.	% Change	The Whole World	% Change
1993	18,522	~	2,271,309	~
1994	24,761	33.7%	2,457,173	8.2%
1995	31,990	29.2%	2,461,299	0.2%
1996	35,845	12.1%	2,669,047	8.4%
1997	40,157	12.0%	2,756,654	3.3%
1998	40,592	1.1%	2,844,946	3.2%
1999	43,121	6.2%	2,898,246	1.9%
2000	49,865	15.6%	3,107,491	7.2%
2001	45,070	-9.6%	3,197,764	2.9%
2002	55,620	23.4%	3,237,710	1.2%
2003	53,700	-3.5%	3,557,143	9.9%
Average(1993-2003)	39,931	12.0%	2,859,889	4.6%
Average(1993-2000)	35,607	15.7%	2,683,271	4.6%
Average(2000-2003)	51,064	3.4%	3,275,027	4.7%

Source: FAOSTAT Databases, 2005

Methodology

The differential factor allocation model is a derived demand model (i.e., not consumer demand). The derived demand model is determined from the minimization of the cost to obtain a predetermined level of output. The inputs are cheeses that come from different countries. This formulation allows the competitive advantage/disadvantage to be analyzed that each country experiences relative to other countries. The sensitivity of the quantity demanded to a country's own price (price elasticity of demand) as well as to the price of a competing country (cross price elasticity of demand) is calculated from the derived demand equation. The price elasticity of demand is used to determine the impact of export subsidy reduction on an exporters' quantity of exports. The cross price elasticities of demand are used to

determine the level of competition between countries. The Divisia import elasticity shows the percentage change in a country's exports that are imported into another country given a one percent change in the importing country's imports.

Empirical Projection

The U.S. has the largest Divisia import elasticity among countries, which means that if there is an increase in imports over time, U.S. cheese imports into Hong Kong will increase by a larger percent than imports from the E.U., Oceania or ROW (Table 3). This indicates that if the total cheese imports into Hong Kong increase by 1.0%, holding all prices constant, the cheese exports from the U.S., Oceania, and the E.U. will increase by 1.284%, 1.013%, and 1.196%, respectively. Therefore, the U.S. is the biggest beneficiary when total cheese imports into Hong Kong increase.

Table 3. Hong Kong Divisia and Price Elasticities of Derived Demand for Imported Cheese.

Exporting Country	Elasticities					
	Divisia Import	Conditional ^a Own-Price	Conditional ^a Cross Price			
			U.S.	Oceania ^c	E.U.	ROW ^d
U.S.	<i>1.284^b</i> (0.373) ^e	<i>-1.546</i> (0.195)		0.323 (0.393)	<i>0.761</i> (0.391)	<i>0.462</i> (0.274)
Oceania ^c	<i>1.013</i> (0.136)	<i>-0.304</i> (0.183)	0.046 (0.056)		<i>0.387</i> (0.163)	<i>-0.129</i> (0.102)
E.U.	<i>1.196</i> (0.215)	<i>-1.061</i> (0.339)	<i>0.170</i> (0.087)	<i>0.613</i> (0.257)		<i>0.278</i> (0.192)
ROW	<i>0.459</i> (0.250)	<i>-0.342</i> (0.344)	<i>0.200</i> (0.118)	<i>-0.394</i> (0.311)	<i>0.537</i> (0.372)	

^a The elasticities are based on a predetermined level of output.

^b Italics indicate that the elasticity was significant by at least 0.10 if not less.

^c Australia and New Zealand aggregation

^d ROW: rest of world

^e Asymptotic standard errors are in parentheses which were obtained using the Delta Method in TSP

Source: Washington and Kilmer

In addition, for the own-price elasticity, the U.S. elasticity (-1.546) and the E.U.

elasticity (-1.061) are both elastic, whereas the elasticity of Oceania (-0.304) is inelastic (Table 3). The ROW (-0.342) is inelastic but not statistically different from zero. This means that cheese from the U.S. and E.U. imported into Hong Kong is more sensitive to a price change than cheese from Oceania and ROW. If the cheese import price decreases by one percent, U.S. cheese exports to Hong Kong will increase by 1.546% and the E.U. cheese exports to Hong Kong will increase by 1.061%. However, the cheese exports to Hong Kong for Oceania and ROW will increase by 0.304% and zero percent. Therefore, the U.S. will realize the largest change based on an own price change. This means that the U.S. quantity will decrease the most if there is a U.S. price increase and the U.S. quantity will increase the most with a U.S. price decrease.

The Cross-price elasticities indicate a substitution relationship (i.e., positive relationship) between exporting sources except Oceania and ROW (i.e., negative or complementary relationship) (Table 3). The U.S./ E.U. cross-elasticity is 0.761 and the Oceania / E.U. cross-elasticity is 0.387, which says that if the price of the E.U. cheese increases by 1%, the quantity demanded for U.S. cheese exported into Hong Kong will increase by 0.761%, and the quantity demanded for Oceania cheese exported into Hong Kong will increase by 0.387%. This suggests that U.S. will gain more than Oceania when the E.U. cheese price increases due to a subsidy reduction.

A one percent reduction in E.U. subsidies will increase the price of E.U. cheese in Hong Kong by 0.619% (Washington and Kilmer, p. 82). If the E.U. had reduced its subsidy by 36% or 72% at the end of 2003, imports of U.S. cheese into Hong Kong were projected to increase from 814.98 to 953.19 metric tons (Table 4), which is a

Table 4. Hong Kong Cheese Imports Given A 36% and 72% E.U. Export Subsidy Reduction, 2003.

Year	U.S.	Oceania	E.U.	ROW
		(Metric Tons)		
2003 ¹ (Actual)	814.98	6773.44	1483.07	175.19
2003 ² (36% E.U. Cheese Subsidy Reduction)	953.19	7357.58	1132.42	175.19
2003 ² (72% E.U. Cheese Subsidy Reduction)	1091.39	7941.71	781.78	175.19

¹ Source: United Nations Statistics Division

² Projected. This projection uses the 2003 (Actual) quantity as a base and assumes that the only cheese price change would have been an increase in the E.U. price of cheese in Hong Kong which was caused by an E.U. cheese subsidy reduction.

16.96% increase. Over the same period, E.U. imports would decrease by 23.64%, from 1483.07 to 1132.42 metric tons. If the export subsidy reductions were to double (72%), imports of U.S. cheese into Hong Kong were projected to increase from 814.98 to 1091.39 metric tons (Table 4), which is a 33.92% increase compared to a decrease of 47.29% of E.U. cheese imported into Hong Kong. ROW did not change because the cross price elasticity is not statistically different from zero (Table 4). Oceania imports would increase by 8.62% and 17.25% for a 36% and 72% export subsidy reduction by the E.U. (Table 4).

Summary

The study provides the U.S. dairy industry with an empirical projection of the potential increase in Hong Kong's derived demand for imported cheese from the U.S. compared to other source countries, such as the E.U., Oceania and ROW. When total cheese imports into Hong Kong change, U.S. cheese imports into Hong Kong will change by a larger percent than that of other countries.

Based on E.U. export subsidy reduction, the E.U. cheese price will increase which will make U.S cheese more competitive. This will increase the cheese quantity demanded from the U.S. by Hong Kong. If the E.U. export subsidy reduction were

36%, the U.S. cheese exported to Hong Kong would increase by 16.96%. If the E.U. subsidy reduction were 72%, the U.S. percentage increase would be 33.92%. If E.U. subsidies were reduced, U.S. cheese could compete with the E.U. and ROW in the Hong Kong cheese market and increase its market share. It will help the U.S. to compete with Oceania if the characteristics of U.S. cheese products were differentiated from Oceania.

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